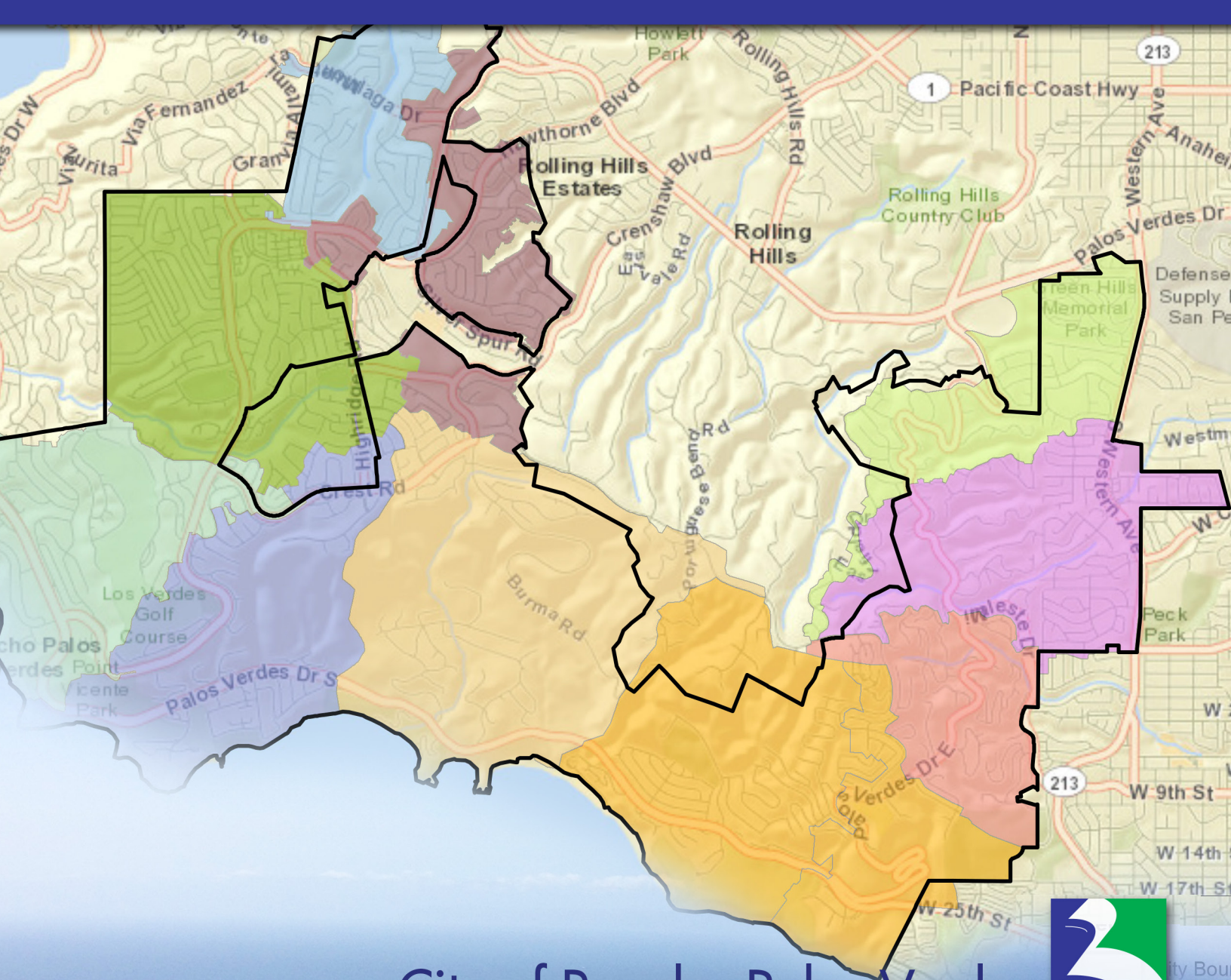




City of Rancho Palos Verdes

Master Plan of Drainage



Michael Baker
INTERNATIONAL

CITY OF RANCHO PALOS VERDES MASTER PLAN OF DRAINAGE

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Final Report

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1 INTRODUCTION.....	1-1
1.1 Background	1-1
1.2 Purpose	1-1
1.3 Report development	1-3
2 TECHNICAL APPROACH.....	2-1
2.1 Modeling Process Approach	2-1
2.2 Storm Drain System Identification Number	2-3
2.3 Hydrology Methodology.....	2-3
2.4 Hydraulic Analysis	2-5
2.4.1 Existing Condition Analysis	2-5
2.4.2 Typical Assumptions.....	2-8
2.4.3 Hydrology Design Criteria.....	2-9
2.4.4 Deficiency Identification	2-9
2.4.5 Street Capacity Analysis.....	2-9
2.4.6 Deficiency Removal and Recommended Improvements.....	2-9
2.5 Cost Estimates	2-10
2.5.1 Total Cost Estimates	2-11
3 OCEAN SOUTH SOUTH.....	3-1
3.1 Watershed Hydrology Analysis	3-1
3.1.1 Hydrology results summary 10-, 25- and 50-year storm event.....	3-1
3.2 Hydraulic Analysis	3-3
3.2.1 Existing Condition.....	3-3
3.2.2 Recommended Improvements	3-5
3.2.3 Cost Estimates	3-6
4 OCEAN SOUTH EAST	4-1
4.1 Watershed Hydrology Analysis	4-1
4.1.1 Hydrology Results Summary 10-, 25-, 50-year storm events.....	4-1
4.2 Hydraulic Analysis	4-4
4.2.1 Existing Condition.....	4-4
4.2.2 Recommended Improvements	4-5
4.2.3 Cost Estimates	4-7
5 OCEAN SOUTH WEST	5-1
5.1 Watershed Hydrology Analysis	5-1
5.1.1 Hydrology Results Summary 10-, 25-, 50-year storm events.....	5-1
5.2 Hydraulic Analysis	5-4
5.2.1 Existing Condition.....	5-4
5.2.2 Recommended Improvements	5-5
5.2.3 Cost Estimates	5-6

6	OCEAN WEST.....	6-1
6.1	Watershed Hydrology Analysis	6-1
6.1.1	Hydrology Results Summary 10-, 25-, 50-year storm events	6-1
6.2	Hydraulic Analysis.....	6-3
6.2.1	Existing Condition.....	6-3
6.2.2	Recommended Improvements	6-5
6.2.3	Cost Estimates	6-5
7	LOS ANGELES HARBOR SOUTH.....	7-1
7.1	Watershed Hydrology Analysis	7-1
7.1.1	Hydrology Results Summary 10-, 25-, 50-year storm events	7-1
7.2	Hydraulic Analysis.....	7-2
7.2.1	Existing Condition.....	7-2
7.2.2	Recommended Improvements	7-4
7.2.3	Cost Estimates	7-5
8	LOS ANGELES HARBOR EAST	8-1
8.1	Watershed Hydrology Analysis	8-1
8.1.1	Hydrology Results Summary 10-, 25-, 50-year storm events	8-1
8.2	Hydraulic Analysis.....	8-3
8.2.1	Existing Condition.....	8-3
8.2.2	Recommended Improvements	8-4
8.2.3	Cost Estimates	8-5
9	LOS ANGELES HARBOR NORTH.....	9-1
9.1	Watershed Hydrology Analysis	9-1
9.1.1	Hydrology Results Summary 10-, 25-, 50-year storm events	9-1
9.2	Hydraulic Analysis.....	9-2
9.2.1	Existing Condition.....	9-2
9.2.2	Recommended Improvements	9-3
9.2.3	Cost Estimates	9-3
10	PALOS VERDES ESTATES NORTH.....	10-1
10.1	Watershed Hydrology Analysis	10-1
10.1.1	Hydrology Results Summary 10-, 25-, 50-year storm events	10-1
10.2	Hydraulic Analysis.....	10-2
10.2.1	Existing Condition.....	10-2
10.2.2	Recommended Improvements	10-2
10.2.3	Cost Estimates	10-3
11	PALOS VERDES ESTATES WEST	11-1
11.1	Watershed Hydrology Analysis	11-1
11.1.1	Hydrology Results Summary 10-, 25-, 50-year storm events	11-1
11.2	Hydraulic Analysis.....	11-5
11.2.1	Existing Condition.....	11-5
11.2.2	Recommended Improvements	11-5

11.2.3 Cost Estimates	11-6
12 ROLLING HILLS ESTATES	12-1
12.1 Watershed Hydrology Analysis	12-1
12.1.1 Hydrology Results Summary 10-, 25-, 50-year storm events	12-1
12.2 Hydraulic Analysis	12-3
12.2.1 Existing Condition	12-3
12.2.2 Recommended Improvements	12-4
12.2.3 Cost Estimates	12-5
13 IMPLEMENTATION PROGRAM AND CIP SCHEDULE	13-1
13.1 Prioritization Criteria	13-1
13.2 Capital Improvement Projects Schedule	13-10
13.3 Future Considerations	13-18
14 REFERENCES.....	14-1

TABLES

Table ES-1: CIP Schedule Summary	ii
Table 2-1: City Pipe Inventory	2-5
Table 2-2: Summary by Diameter	2-7
Table 2-3: Summary by Material	2-8
Table 2-4: Pipe Unit Price	2-10
Table 2-5: Total Recommended Improvements Cost Estimates City Owned Pipes	2-11
Table 2-6: Total Recommended Improvements Cost Estimates LA County Owned Pipes	2-12
Table 3-1: OSS Hydrology Summary	3-1
Table 3-2: OSS Hydraulic Model Assumptions	3-3
Table 3-3: Altamira Canyon Velocity Summary	3-5
Table 3-4: OSS Flooded Storm Drain Structures	3-5
Table 3-5: OSS Pipes to be Improved	3-6
Table 3-6: OSS Total Cost Estimate	3-6
Table 4-1: OSE-A Hydrology Summary	4-2
Table 4-2: OSE-B Hydrology Summary	4-3
Table 4-3: OSE Hydraulic Model Assumptions	4-4
Table 4-4: OSE-A Flooded Storm Drain Structures	4-5
Table 4-5: OSE-B Flooded Storm Drain Structures	4-5
Table 4-6: OSE-A Pipes to be Improved	4-6
Table 4-7: OSE-B Pipes to be Improved	4-6
Table 4-8: OSE Total Cost Estimate	4-7
Table 5-1: OSW Hydrology Summary	5-1
Table 5-2: OSW Hydraulic Model Assumptions	5-4
Table 5-3: OSW Flooded Storm Drain Structures	5-5
Table 5-4: OSW Pipes to be Improved	5-5

Table 5-5: OSW Total Cost Estimate	5-6
Table 6-1: OWW Hydrology Summary	6-1
Table 6-2: OWW Hydraulic Model Assumptions	6-3
Table 6-3: Calle Entradero Channel Velocity Summary	6-4
Table 6-4: OWW Flooded Storm Drain Structures	6-4
Table 6-5: OWW Pipes to be Improved	6-5
Table 6-6: OWW Total Cost Estimate	6-5
Table 7-1: LAS Hydrology Summary	7-1
Table 7-2: LAS Hydraulic Model Assumptions	7-3
Table 7-3: LAS Flooded Storm Drain Structures	7-3
Table 7-4: LAS Pipes to be Improved	7-4
Table 7-5: LAS Total Cost Estimate	7-5
Table 8-1: LAE Hydrology Summary	8-1
Table 8-2: LAE Hydraulic Model Assumptions	8-3
Table 8-3: LAE Flooded Storm Drain Structures	8-3
Table 8-4: LAE Pipes to be Improved	8-4
Table 8-5: LAE Total Cost Estimate	8-5
Table 9-1: LAN Hydrology Summary	9-1
Table 9-2: LAN Hydraulic Model Assumptions	9-2
Table 9-3: LAN Flooded Storm Drain Structures	9-3
Table 10-1: PVN Hydrology Summary	10-1
Table 10-2 PVN: Flooded Storm Drain Structures	10-2
Table 10-3: PVN Pipes to be Improved	10-2
Table 10-4: PVN Total Cost Estimate	10-3
Table 11-1: PVW Hydrology Summary	11-1
Table 11-2: PVW Flooded Storm Drain Structures	11-5
Table 11-3: PVW Pipes to be Improved	11-6
Table 11-4: PVW Total Cost Estimate	11-6
Table 12-1: RHE-A Hydrology Summary	12-1
Table 12-2: RHE-B Hydrology Summary	12-2
Table 12-3: RHE Hydraulic Model Assumptions	12-3
Table 12-4: RHE-A Flooded Storm Drain Structures	12-4
Table 12-5: RHE-B Flooded Storm Drain Structures	12-4
Table 12-6: RHE Pipes to be Improved	12-4
Table 12-7: RHE Total Cost Estimate	12-5
Table 13-1: Prioritization Pipes to be Improved	13-2
Table 13-2: CIP Schedule Summary	13-11
Table 13-3: CIP Schedule Priority 1 Projects	13-12
Table 13-4: CIP Schedule Priority 2 Projects	13-14
Table 13-5: CIP Schedule Priority 3 Projects	13-15

FIGURES

Figure 1-1: Drainage Areas Map.....	1-2
Figure 2-1: Modeling Process Approach.....	2-2
Figure 2-2: Subwatershed Flow Paths	2-3
Figure 3-1: OSS - Recommended Improvements Index Map	3-7
Figure 4-1: OSE - Recommended Improvements Index Map	4-8
Figure 5-1: OSW - Recommended Improvements Index Map	5-7
Figure 6-1: OWW - Recommended Improvements Index Map	6-6
Figure 7-1: LAS - Recommended Improvements Index Map	7-6
Figure 8-1: LAE - Recommended Improvements Index Map	8-6
Figure 10-1: PVN - Recommended Improvements Index Map	10-4
Figure 11-1: PVW - Recommended Improvements Index Map	11-7
Figure 12-1: RHE - Recommended Improvements Index Map	12-6

EXHIBITS

Exhibit A: LAND USE MAP
Exhibit B: RAINFALL DEPTH AND SOILS CLASSIFICATION MAP
Exhibit C: STORM DRAIN SYSTEMS MISSING DATA
Exhibit D: OCEAN SOUTH SOUTH HYDROLOGY MAP
Exhibit E: OCEAN SOUTH EAST- A HYDROLOGY MAP
Exhibit F: OCEAN SOUTH EAST- B HYDROLOGY MAP
Exhibit G: OCEAN SOUTH WEST HYDROLOGY MAP
Exhibit H: OCEAN WEST HYDROLOGY MAP
Exhibit I: LOS ANGELES HARBOR SOUTH HYDROLOGY MAP
Exhibit J: LOS ANGELES HARBOR EAST HYDROLOGY MAP
Exhibit K: LOS ANGELES HARBOR NORTH HYDROLOGY MAP
Exhibit L: PALOS VERDES NORTH HYDROLOGY MAP
Exhibit M: PALOS VERDES WEST HYDROLOGY MAP
Exhibit N: ROLLING HILLS ESTATES HYDROLOGY MAP
Exhibit O: RECOMMENDED IMPROVEMENTS PRIORITIES MAP

TECHNICAL APPENDICES (PRINT)

Appendix A ALTAMIRA CANYON AND PBL PROFILES.....	1
Appendix A-1 ALTAMIRA CANYON PROFILE 1.....	2
Appendix A-2 ALTAMIRA CANYON PROFILE 2.....	4
Appendix B COST ESTIMATES.....	6
Appendix B-1 OCEAN SOUTH SOUTH.....	7
Appendix B-2 OCEAN SOUTH EAST.....	12
Appendix B-3 OCEAN SOUTH WEST	24

Appendix B-4 OCEAN WEST	30
Appendix B-5 LOS ANGELES HARBOR SOUTH.....	36
Appendix B-6 LOS ANGELES HARBOR EAST.....	48
Appendix B-7 PALOS VERDES ESTATES NORTH.....	64
Appendix B-8 PALOS VERDES ESTATES WEST.....	69
Appendix B-9 ROLLING HILLS ESTATES	72
Appendix C CCTV INSPECTIONS.....	82
Appendix C-1 CCTV INSPECTIONS TABLE 2014-2015.....	83
Appendix C-2 CCTV INSPECTIONS TABLE 2012.....	115
 TECHNICAL APPENDICES (CD)	
Appendix D OCEAN SOUTH SOUTH.....	2
Appendix D-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	3
Appendix D-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year).....	10
Appendix D-3 PROPOSED HYDRAULICS RESULTS	92
Appendix E OCEAN SOUTH EAST A AND B.....	121
Appendix E-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	122
Appendix E-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	132
Appendix E-3 PROPOSED HYDRAULICS RESULTS	640
Appendix F OCEAN SOUTH WEST.....	810
Appendix F-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	811
Appendix F-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	821
Appendix F-3 PROPOSED HYDRAULICS RESULTS	1143
Appendix G OCEAN WEST.....	1252
Appendix G-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	1253
Appendix G-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	1263
Appendix G-3 PROPOSED HYDRAULICS RESULTS	1669
Appendix H LOS ANGELES HARBOR SOUTH.....	1942
Appendix H-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	1943
Appendix H-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	1950
Appendix H-3 PROPOSED HYDRAULICS RESULTS	2515
Appendix I LOS ANGELES HARBOR EAST.....	2704
Appendix I-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	2705
Appendix I-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	2712
Appendix I-3 PROPOSED HYDRAULICS RESULTS.....	2942
Appendix J LOS ANGELES HARBOR NORTH.....	3097
Appendix J-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	3098
Appendix J-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	3105

Appendix K PALOS VERDES ESTATES NORTH.....	3244
Appendix K-1 EXISTING HYDROLOGY (10-, 25-, and 50-year).....	3245
Appendix K-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year).....	3249
Appendix K-3 PROPOSED HYDRAULICS RESULTS.....	3352
Appendix L PALOS VERDES ESTATES WEST.....	3387
Appendix L-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	3388
Appendix L-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	3398
Appendix L-3 PROPOSED HYDRAULICS RESULTS.....	3843
Appendix M ROLLING HILLS ESTATES.....	4146
Appendix M-1 EXISTING HYDROLOGY (10-, 25-, and 50-year)	4147
Appendix M-2 EXISTING HYDRAULICS RESULTS (10-, 25-, and 50-year)	4157
Appendix M-3 PROPOSED HYDRAULICS RESULTS.....	4407

EXECUTIVE SUMMARY

The City of Rancho Palos Verdes Master Plan of Drainage (MPD) provides an analysis of existing storm drain facilities located within the City of Rancho Palos Verdes (RPV or City) jurisdiction. This analysis is an update to the 2004 Master Plan of Drainage prepared by AKM Consulting Engineers. The MPD divides the City into 10 different drainage areas, named according to the receiving water body and the adjacent city to which they are tributary. The 10 drainage areas are Ocean South South, Ocean South East, Ocean South West, Ocean West, Los Angeles Harbor South, Los Angeles Harbor East, Los Angeles Harbor North, Palos Verdes Estates North, Palos Verdes Estates West and Rolling Hills Estates. The hydrology and hydraulic analyses were completed for each drainage area.

The goal of the MPD is to provide comprehensive long-range planning for the implementation and development of drainage facility improvements, determine the cost of implementing such facilities, discuss funding priorities, and provide an implementation schedule of the improvements within the City. Hydrology and hydraulic analyses for the storm drain facilities were modeled using the XP-Solutions Stormwater and Wastewater Management Modeling (XP-SWMM) program. XP-SWMM provides a hydrodynamic modeling approach that facilitates the modeling process, and it is a tool the City could incorporate in future storm drain design projects. Initial setup of the model required research on all available as-built information of the entire City's storm drain systems. For this research, the existing City's geographic information system (GIS) database was updated, and field visits were completed. ArcGIS was used to organize and compile all of the information needed to model each storm drain system, including but not limited to diameter, material, and invert elevations.

The hydrology and hydraulic analyses were completed for the 10-, 25- and 50-year storm events. The Los Angeles County Department of Public Works 2006 Hydrology Manual was used as the basis for the hydrology analysis. Each drainage area was divided into different subwatersheds tributary to strategic storm drain structures selected for modeling purposes as the runoff water collectors into the storm drain systems. After the hydrology analysis was completed, the hydraulic analysis was run. The 1982 Los Angeles County Flood Control Hydraulics Design Manual was used as the basis for the hydraulics analysis. The results obtained from the hydraulic model were used to find deficiencies within the storm drain systems. Several options were run to complete the recommended improvements analysis. This analysis is a preliminary assessment, and it is recommended that before the completion of each capital improvement project an engineering design study be prepared using the MPD XP-SWMM model as a basis.

Once deficiencies were identified and the recommended improvements analysis completed, each project cost was calculated. The cost per project included project construction, engineering design, and project administration costs. A prioritization scheme was prepared and used to complete the Capital Improvement Projects (CIP) schedule. The recommended improvement projects for this MPD were prioritized based on risk assessment criteria of 1, 2 or 3. Twenty-six systems were found to be priority 1, 13 systems priority 2, and 36 systems priority 3. The CIP

schedule outlines the recommended implementation to complete the projects based on risk characterization, potential impacts, and prioritization. Currently, a storm drain user fee provides \$1.3 million per year to fund drainage facilities projects. This tax expires in 2016; however, for this MPD, it is assumed that it will be renewed. The CIP schedule uses a 10-year program horizon considering \$1.3 million as available funding for each year as shown in table ES-1. Years 1 through 9 were found to have deficient funds and would require other sources to fund the projects.

Table ES-1: CIP Schedule Summary		
Year	Cost	Priority
1	\$1,769,000.00	1 & 2
2	\$2,229,000.00	1 & 2
3	\$1,729,000.00	1,2 & 3
4	\$2,629,000.00	1 & 3
5	\$1,798,000.00	2 & 3
6	\$1,471,000.00	2 & 3
7	\$1,988,000.00	3
8	\$1,243,000.00	3
9	\$1,507,000.00	3
10	\$1,251,000.00	3
Total	\$17,614,000.00	

1 INTRODUCTION

The Master Plan of Drainage (MPD) for the City of Rancho Palos Verdes (RPV or City) was prepared by Michael Baker International (Michael Baker). The MPD uses a comprehensive modeling approach and enables the City to

- Verify their geographic information system (GIS) database inventory;
- Update the hydrology and hydraulic calculations for all City storm drain systems;
- Assess storm drain pipe capacity;
- Identify improvements needed with associated cost estimates; and
- Develop a scheme to prioritize and implement the proposed recommendations.

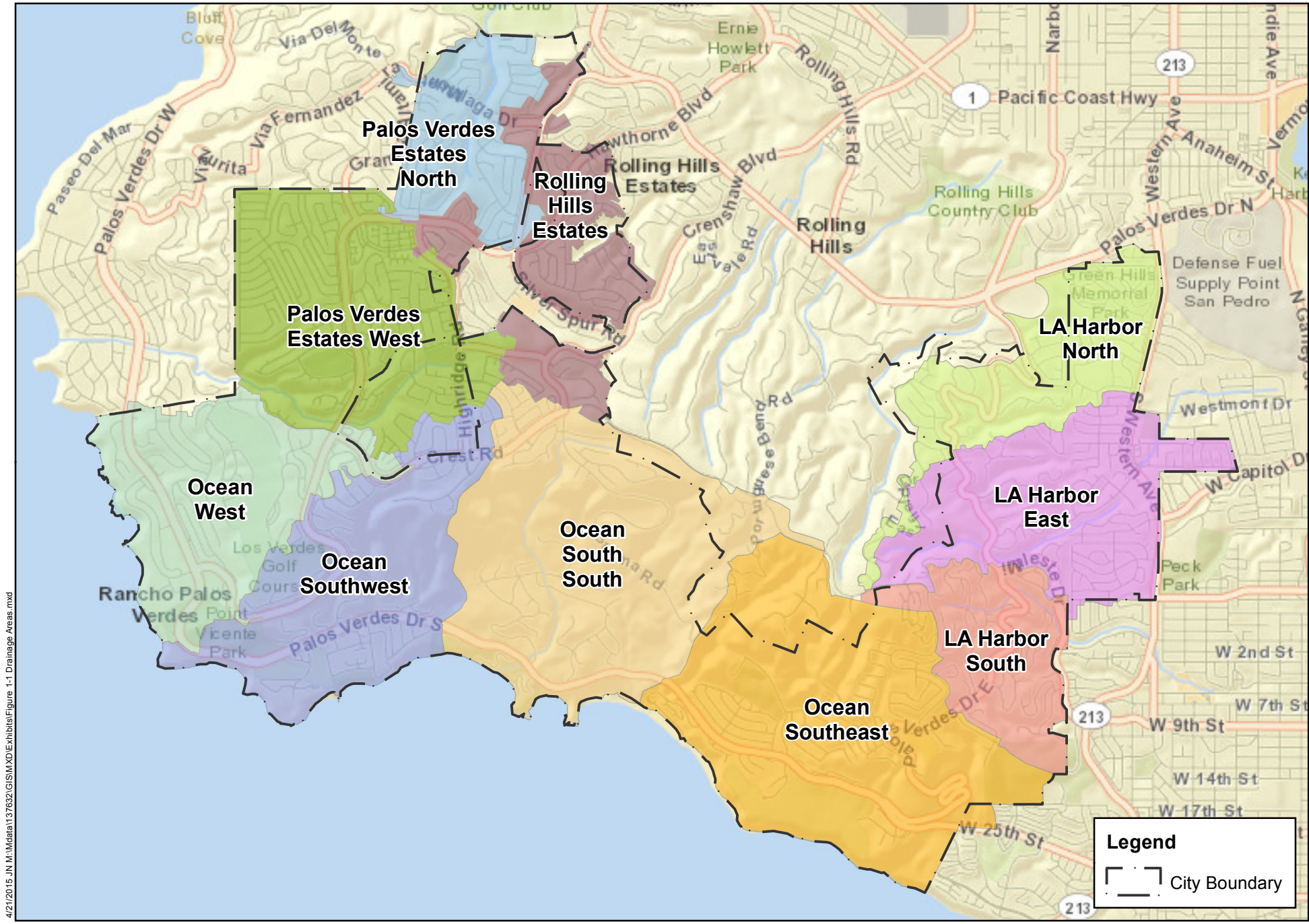
This MPD divides the City into 10 different drainage areas: Palos Verdes Estates North (PVN), Palos Verdes Estates West (PVW), Rolling Hills Estates (RHE), Ocean West (OWW), Ocean South West (OSW), Ocean South South (OSS), Ocean South East (OSE), Los Angeles Harbor South (LAS), Los Angeles Harbor North (LAN) and Los Angeles Harbor East (LAE) as shown in Figure 1-1. The first part of each drainage area name indicates the receiving water body name, and the second indicates the geographical location.

1.1 Background

The City is comprised of approximately 14 square miles on the Palos Verdes Peninsula in the southwest portion of Los Angeles County. The majority of the City drains to natural canyon systems with direct discharge to the ocean. This MPD updates the Master Plan of Drainage prepared in 2004 by AKM Consulting Engineers. The 2004 Master Plan of Drainage divided the City into six different drainage areas. These drainage areas have been further divided for this study into 10 areas to gain a better understanding of the drainage patterns of the City. The 2004 report was prepared using the County of Los Angeles MORA hydrology computer program used to analyze the hydrology within the City. The 2004 MPD also provided hydraulic calculations using normal depth calculations based on Manning's equation.

1.2 Purpose

The goal of the MPD is to provide comprehensive long-range planning for the implementation and development of drainage facility improvements, determine the cost of implementing such facilities, and discuss funding priorities of the improvements within the City of Rancho Palos Verdes. Hydrology and hydraulic analysis for the storm drain facilities within RPV were modeled using the XP-Solutions Stormwater and Wastewater Management Modeling (XP-SWMM) program. XP-SWMM is a comprehensive hydrology and hydraulics program that was used to update the watershed hydrology and analyze the storm drain hydraulics. The program was used to identify issues in the existing storm drain systems and to determine the best alternative to alleviate deficiencies.



4/21/2015 J:\M:\data\137632\GIS\MXD\Exhibits\Figure 1-1 Drainage Areas.mxd



Source: City of Rancho Palos Verdes

1.3 Report development

This report explains how the MPD was developed. It is organized as follows:

1. Technical approach (Chapter 2): Detailed explanation of the hydrology and hydraulic modeling basis, and cost estimates approach.
2. Drainage areas (Chapters 3-12): Each of the ten drainage area has its own chapter covering the following:
 - Existing hydrology description and results.
 - Existing hydraulic analysis assumptions and results.
 - Deficiency removal, recommended improvements and cost estimates.
 - Recommended improvements maps.
3. Capital Improvements: The prioritization, implementation, and Capital Improvement Program (CIP) are discussed in Chapter 13.
4. Exhibits: Land use map, soils classification map, and each drainage area hydrology map are located following the main report.
5. Technical Appendices: XP-SWMM output data files and detail cost estimate table backup.